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## THE PROGRESS OF SCIENCE

### CURRENT COMMENT

By DR. EDWIN E. SLOSSON  
*Science Service*

### EVOLUTION WORKING BACKWARD

ONCE farmers planted the nubbins of their corn and the potatoes that were too small to sell. Now they know better. They cut up their finest potatoes to plant, and every grain of their seed corn is pedigreed as carefully as a Colonial Dame. The result is seen in the doubled yield in potatoes richer in starch and corn richer in protein. Modern agriculture is fertilized by science.

The most backward branch of biology is the infant science of sociology. It is only just beginning to get its eyes open, to see things; in time, perhaps it will be able to do things, like the older sciences. But there is need of haste. The age of instinct is passing, the reign of reason has not come. Man has been pushed up to his present position. He has succeeded in slackening the pressure. Will he go forward rationally, of his own free will, or sink back until again he falls under the sway of the blind and merciless forces of the struggle for existence?

A decrease in the birth rate is not necessarily a misfortune to a country. Very likely, for instance, the British Isles have now all the population they can support in comfort under present economic conditions. The alarming thing about it is that the breeding is from the poorest stock instead of the best. Whatever objective standard one may take this is true. A statistical study of the population of Great Britain showed that in the districts where there was the most overcrowding, the cheapest type of labor, the lowest degree of culture and edu-

cation, the highest percentage of pauperism and lunacy, the greatest criminality and the highest death rate from tuberculosis and infantile diseases, there the number of children was greatest in proportion to the possibly productive wives. It is a clear case of the survival of the unfittest, the reversal of evolution. No race can maintain its efficiency and virility against such reactive forces.

The future of a country depends ultimately upon the character and ability of its people. Increase of wealth, advance of science, improvement in education, discoveries in sanitation, juster social conditions, all the achievements and hopes of the present age will be of little benefit to posterity if there is a decline in the native quality of the race. It would be disastrous to hand over a more perfect and complicated governmental machine to inferior engineers. One seventh of the present generation will be the parents of one half of the next. Therefore, two generations of selection, natural or designed, would completely transform the character of a nation. Is this seventh composed of the best men and women that we have?

This is what is going to determine whether civilization shall advance or retrograde. Galton's ideal of eugenics may be too much in advance of the age to be practical, but at least something could be done to awaken the people to the imminent dangers of dysgenics.

### ATOMS OF LIGHT

THE discovery of the X-rays in 1895 acted like the discovery of gold in an unexplored country. It opened the way to the exploration of a field of unsuspected wealth of new knowledge and to the radical reconstruc-

tion of some of our time-honored and fundamental conceptions. It opened up to us the atom, the *ne plus ultra* of the chemist, and showed within it a system of revolving bodies far more numerous and complicated than the solar system. Already our knowledge of these electrons, whose existence was unsuspected a few years ago, is greater than our knowledge of the molecules, and we can study them with much more facility because they carry charges of electricity which betray their presence in the minutest number. A single electron can be detected while the smallest number of gas molecules which can be discerned with the spectroscope is about ten million million.

The tendency of the times is to extend the atomic theory into new fields, to speak of atoms of electricity, of energy and of light. The corpuscle, the smallest known particle of negative electricity, is only one seventeen-hundredth the mass of the atom of hydrogen. The smallest unit of positive electricity, on the other hand, seems to be equal to the atom of hydrogen. It is possible, however, that this positive particle may be a complex of many positive and negative particles and that the individual positive corpuscle when isolated as the negative one has been may prove to be equally minute.

The discovery of the enormous stores of energy compact in the atom in the form of the electrostatic potential energy of its negative corpuscles gives one a peculiar sensation. It is like finding out that there is a barrel of gold and a dynamite bomb in the cellar of the house. But a gram of hydrogen would be capable of developing more heat than the burning of thirty-five tons of coal. Since energy is wealth we have everywhere enough to make us all rich "beyond the dreams of avarice" forever, but we have no way of unlocking this storehouse. This may be fortunate for us since Professor J. J.

Thomson, of Cambridge, says, "if at any time an appreciable fraction were to get free the earth would explode and become a gaseous nebula." Professor Thomson, in compensation for our natural disappointment at being frightened off these presences by such a terrifying spring-gun, reminds us that on every sunny acre 7,000 horse-power of radiant energy from our solar dynamo is going to waste and that it is neither impossible nor dangerous to utilize it.

#### THE LITTLE ENEMIES OF MAN

EARLY in the history of the human race man learned how to conquer the mastodon. He has yet to learn how to master the microbe. Whales and elephants are now almost extinct, but mice and flies still increase and multiply, and the bacteria, smallest and most dangerous of all, find new ways of attacking us. It is only within the last few years that man has learned which his greatest enemies are, and he has not yet found weapons against them. The explorer in tropical jungles used to fear the lions, tigers and pythons; now he protects himself most carefully against the mosquitoes and tsetse. Mars has afflicted the human race less than Beelzebub.

Although we theoretically accept the conclusion of science that a man's foes are those of his own household, we are not yet aroused to the necessity of waging war in earnest against them. We have a secretary of navy and we give him millions for defense, but we have no secretary of sanitation, though that is a more necessary office. It is quite improbable that any American will be killed by an invading army this year, but our land is invaded by millions of mosquitoes and flies armed with deadly weapons and certain to slaughter thousands. Years of study and experimentation will be necessary before we learn how to fight our insect foes, but already enough has been done to show